# BALANCING FRESHWATER NEEDS IN A CHANGING LANDSCAPE

## Stay in touch

The National Estuarine Research Reserves (NERRS) Science Collaborative is committed to sharing information about the projects we fund in the most effective way we can. Updates about this project will be communicated through nerrs.noaa.gov, webinars, conferences, and meetings. If you would like to stay in touch with this project, contact our program coordinator Cindy Tufts: cindy.tufts@unh.edu.

For questions about the applied science aspect of this project, contact at the Mission-Aransas NERR: Sally Palmer, manager, sally.palmer@utexas.edu; Ed Buskey, research coordinator, ed.buskey@mail.utexas.edu; or Kiersten Madden, kiersten.madden@mail.utexas.edu.

For questions about the collaborative process being used to generate data and restoration planning tools that are relevant to intended users, contact Tarla Rai Peterson, Texas A&M University, MissionAransas@gmail.com.

## What's happening?

A team led by the Mission-Aransas National Estuarine Research Reserve (NERR) received a grant to conduct scientific research that will assist in the development of freshwater inflow recommendations that maintain the health and productivity of Texas' Guadalupe-San Antonio and Mission Aransas estuaries.

The team will use the Collaborative Learning Method to bring scientists and other stakeholders such as ranchers, fishermen, boaters, and planners together to better understand the effects of land use and climate change on freshwater inflows, the circulation of freshwater between estuaries, and the biology of commercially and ecologically important marine animals.

Ultimately, they will use this knowledge to create a system dynamics model of the Guadalupe-San Antonio and Mission-Aransas estuaries that stakeholders can use to develop recommendations on how much water should be allowed to flow to support communities, and how much to support the estuaries upon which local economies and quality of life depend.

## Why this project?

The estuaries of central Texas are vital to the state's economy, supporting a multi-billion dollar fishing industry and a growing tourist industry. Estuaries need freshwater to maintain healthy habitats for



Blue crabs are just one of the indicator species that the Senate Bill 3 process has looked at to help develop freshwater inflow recommendations for Texas estuaries.

fish, but the water demands of a growing population, changes in land use, and a shifting climate have all combined to reduce the amount of freshwater that estuaries along the state's central coast receive.

Historic drought conditions and increasing water demands spurred the Texas legislature to consider the health of estuaries in a new piece of legislation. Senate Bill 3 calls for a participatory public process to establish freshwater flow standards based on input from two groups of stakeholders—the Basin and Bay Area Stakeholder Committee (BBASC) and the Basin and Bay Area Expert Science Team (BBEST).

The goal of this legislation is to develop freshwater inflow policies that account for the social, physical, and biological drivers that affect the flow of freshwater. This project aims to support that goal by filling identified gaps in the scientific knowledge required to develop accurate flow recommendations.

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Home to the critically endangered Whooping Crane, the Guadalupe-San Antonio and Mission- Aransas estuaries are projected to experience a 36 percent decrease in fresh-water inflows over the next 50 years due to changes in water demand and climate.

## About the funder

The National Estuarine Research Reserves (NERRS) Science Collaborative puts Reserve-based science to work for coastal communities coping with the impacts of land use change, stormwater, nonpoint source pollution, and habitat degradation in the context of a changing climate. Our threefold approach to connecting science to decision making includes:

• Funding: We award an average of $4 million annually to projects that incorporate collaboration and applied science to address a coastal management problem.

• Transfer of knowledge: We are committed to sharing the knowledge generated by the local, place-based research we fund. If you're interested in following this project, contact cindy.tufts@unh.edu.

• Graduate education: We sponsor two fellowships in TIDES, a Master's of Science program at UNH that provides the skills needed to effectively link science to coastal decision making.

The program operates by a cooperative agreement between the University of New Hampshire (UNH) and the National Oceanic and Atmospheric Administration.

**Learn more at....
nerrs.noaa.gov/
ScienceCollaborative.aspx**

# How will this project work?

The project team will work closely with scientists and stakeholders to identify research topics that need to be addressed to improve the quality of freshwater flow recommendations. As they move ahead, the team will use a Collaborative Learning framework to engage stakeholders in focusing and addressing specific research objectives.

This collaborative process will include individual interviews, stakeholder-guided workshops, and mediated modeling—a method that enables diverse stake-holders to understand the multi-dimensional, dynamic, and interactive aspects of environmental problems. The project's goals include the following:

• Examine the effects of land use and climate change on how freshwater flows to the Guadalupe-San Antonio and Mission-Aransas estuaries.

• Work collaboratively to design and carry out a research project related to one of the priority species identified, such as white shrimp, blue crab, rangia clams, or oysters.

• Improve understanding of how water moves between the Mission-Aransas Estuary and adjacent bay systems.

• Improve access to knowledge about freshwater management by developing shared systems of learning among the local stakeholders and scientists, and integrating that learning to construct a system dynamics model of the Guadalupe-San Antonio and Mission-Aransas estuaries.
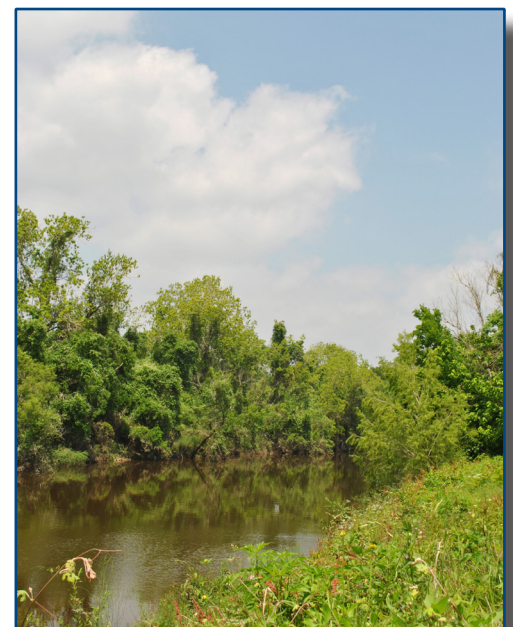


Texas rivers and the estuaries that depend on them are critical to the state's economy and culture.

March 2012